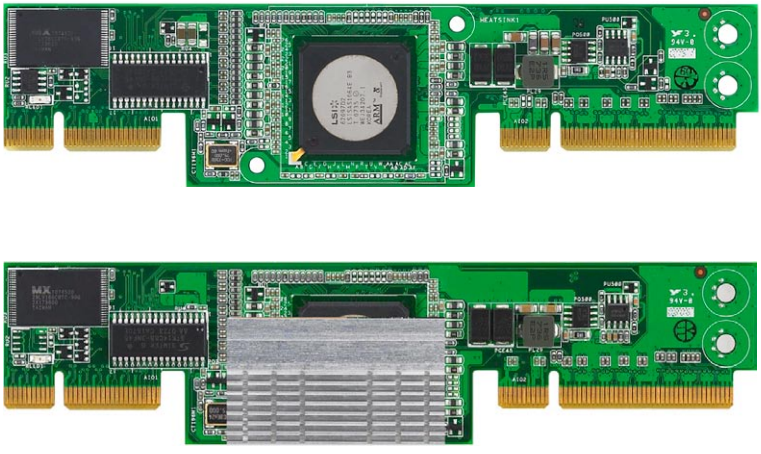
PIKE 1064E/1068E

LSISAS RAID card

User Guide



E5384

Second Edition V2
March 2010

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About this guide

This user guide contains the information you need when installing and configuring the server management board.

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

  This chapter offers the PIKE 1064E/1068E SAS RAID card features and the new technologies it supports.

- **Chapter 2: RAID configuration**

  This chapter provides instructions on setting up, creating, and configuring RAID sets using the available utilities.

- **Chapter 3: Driver installation**

  This chapter provides instructions for installing the RAID drivers on different operating systems.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**

   The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

   Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1+Key2+Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl+Alt+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: `format a:`

PIKE 1064E/1068E specifications summary

Controller	PIKE 1064E: LSISAS1064E PIKE 1068E: LSISAS1068E
Interface	ASUS PIKE interface
Ports	PIKE 1064E: 4 ports PIKE 1068E: 8 ports
Support device	SAS and SATA II devices
Data transfer rate	SATA II and SAS 3 Gb/s per PHY
RAID level	RAID0/RAID1/RAID1E
OS support*	Windows® Server 2003/2000/XP/Vista Red Hat® Enterprise Linux 3/4/5 SUSE Linux Enterprise Server 8/9/10 LSI MegaRAID Storage Manager (MSM) for Windows®/ Linux operating systems
Form factor	6.44 in x 1.57 in (1U compatible)

*** The exact OS support would base on the OS support list of the motherboard.**
**** Specifications are subject to change without notice.**

This chapter offers the PIKE 1064E/1068E SAS RAID card features and the new technologies it supports.

1 Product introduction

1.1 Welcome!

Thank you for buying an ASUS® PIKE 1064E/1068E SAS RAID card!

The ASUS PIKE 1064E/1068E allows you to create RAID0, RAID1, and RAID1E set(s) from SAS hard disk drives connected to the SAS connectors on the motherboard.

Before you start installing the RAID card, check the items in your package with the list below.

1.2 Package contents

Check your package for the following items.

- ASUS PIKE 1064E/1068E SAS RAID card
- Support CD
- User guide

If any of the above items is damaged or missing, contact your retailer.

1.3 Card layout

The illustration below shows the major components of the RAID card.

1. ASUS PIKE interface-1: PCI-E x8
2. ASUS PIKE interface-2: 4-port SAS signal with SGPIO interface (PIKE 1064E)
   8-port SAS signal with SGPIO interface (PIKE 1068E)*
3. SAS RAID card status LED (lights up and blinks to indicate that the card is working normally)

- *The SGPIO interface is used for visibility into drive activity, failure and rebuild status, so that users could build high-performatnce and reliable storage systems. Refer to the motherboard manual for detailed information about using the SGPIO connectors on the motherboard.
- For PIKE 1068E SAS RAID card, a heatsink is installed on the LSISAS1068E controller.

1.4 System requirements

Before you install the PIKE 1064E/1068E SAS RAID card, check if the system meets the following requirements:

- **Workstation or server motherboard with a PIKE RAID card slot**
- **SAS or SATA hard disk drives**
- **Supporting operating system:**

  Windows® and Linux operating systems (refer to website for details)
- **Other requirement:**

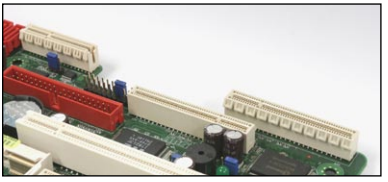
  - Appropriate thermal solution

  - Certified power supply module

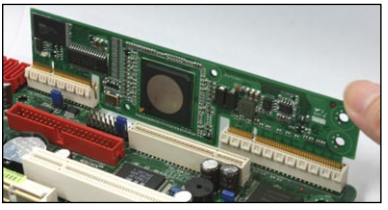
1.5 Card installation

Follow below instructions to install the RAID card on your motherboard.

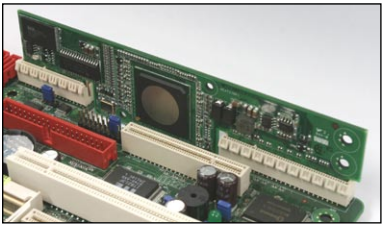
1. Locate the PIKE RAID card slot on the motherboard.



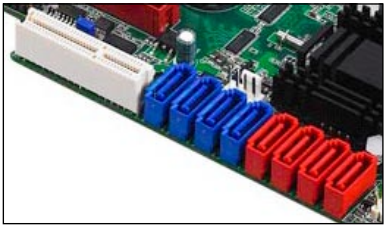
2. Align the golden fingers of the RAID card with the PIKE RAID card slot.



3. Insert the RAID card into the PIKE RAID card slot. Make sure it's completely inserted into the PIKE RAID card slot.



Connect the SAS hard disk drives to SAS connectors 1-4 (red) on the motherboard when using a 4-port PIKE RAID card. The SAS connectors 5-8 (blue) function when using a 8-port PIKE RAID card.



This chapter provides instructions on setting up, creating, and configuring RAID sets using the available utilities.

2 RAID configuration

2.1 Setting up RAID

The RAID card supports RAID 0, RAID 1 and RAID 1E set.

2.1.1 RAID definitions

RAID 0 *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of at least two new identical hard disk drives is required for this setup.

RAID 1 *(Data mirroring)* copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 1E *(Enhanced RAID 1)* has a striped layout with each stripe unit having a secondary (or alternate) copy stored on a different disk. You can use three or more hard disk drives for this configuration.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive.

2.1.2 Installing hard disk drives

The RAID card supports SAS for RAID set configuration. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SAS hard disks for RAID configuration:

1. Install the SAS hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SAS signal cable to the signal connector at the back of each drive and to the SAS connector on the motherboard.
3. Connect a power cable to the power connector on each drive.

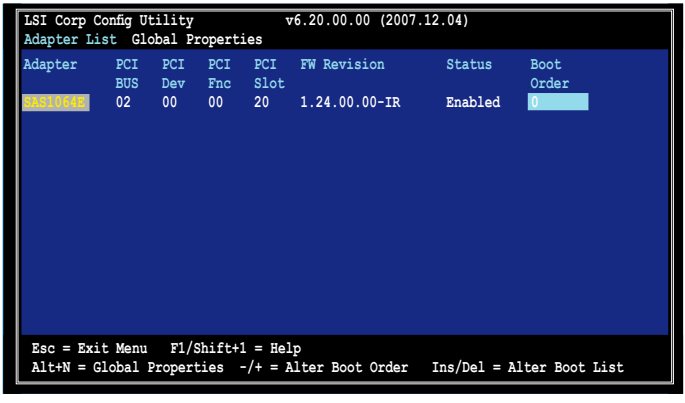
2.2 LSI Corporation MPT Setup Utility

The LSI Corporation MPT Setup Utility is an integrated RAID solution that allows you to create the following RAID set(s) from SAS hard disk drives supported by the LSI SAS 1064E/1068E controller:

- RAID 1 (Integrated Mirroring)
- RAID 1E (Integrated Mirroring Enhanced)
- RAID 0 (Integrated Striping)

- You may use disks of different sizes in IM and IME volumes; however, the size of the smallest disk determines the “logical” size of each member disk.
- DO NOT combine Serial ATA and SAS disk drives in one volume.

- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.
- The adapter name shown on the setup screens differs according to the installed SAS RAID card.
- Before requesting support from the ASUS Technical Support team, you have to take note of the MPTFW and MPTBIOS version for the SAS RAID card. After entering the SAS configuration utility, you can see below screen and identify the MPTFW and MPTBIOS version:
  MPTFW version: 1.24.00.00-IR
  MPTBIOS version: v6.20.00.00 (2007.12.04)


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Adapter PCI BUS PCI Dev PCI Fnc PCI Slot FW Revision Status Boot Order
SAS1064E 02 00 00 20 1.24.00.00-IR Enabled 0
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List

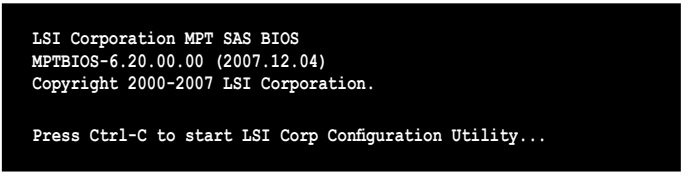
2.2.1 Integrated Mirroring volume

The Integrated Mirroring (IM) feature supports simultaneous mirrored volumes with two disks (IM).

The IM feature supports hot swap capability, so when a disk in an IM volume fails, you can easily restore the volume, and the swapped disk is automatically re-mirrored.

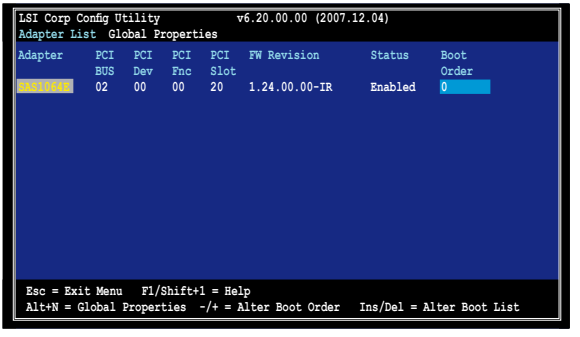
To create an IM volume:

1. Turn on the system after installing all SAS hard disk drives.
2. During POST, press <Ctrl+C> to enter the SAS configuration utility.


LSI Corporation MPT SAS BIOS
MPTBIOS-6.20.00.00 (2007.12.04)
Copyright 2000-2007 LSI Corporation.
Press Ctrl-C to start LSI Corp Configuration Utility...

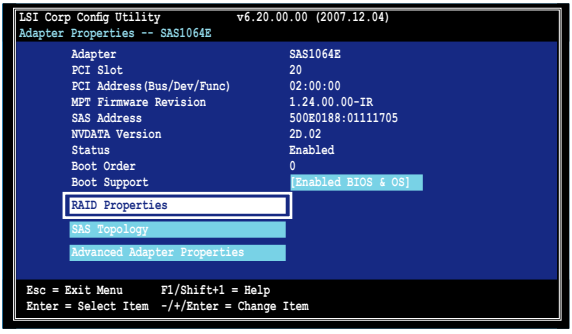
To avoid data loss, do not turn off the system when rebuilding.

3. The following screen appears. Select a channel and press <Enter> to enter the setup.

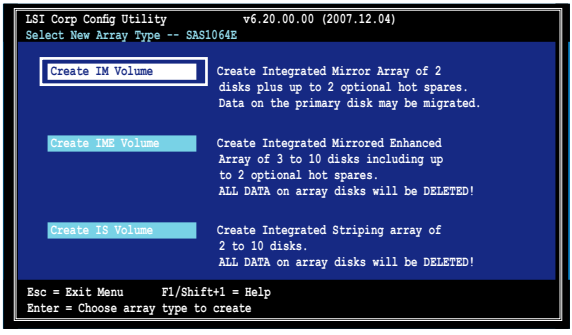

LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Adapter PCI BUS PCI Dev PCI Fnc PCI Slot FW Revision Status Boot Order
SAS1064E 02 00 00 20 1.24.00.00-IR Enabled 0
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List

The numbers of the channel depend on the controller.

4. The **Adapter Properties** screen appears.
Use the arrow keys to select **RAID Properties**, then press <Enter>.

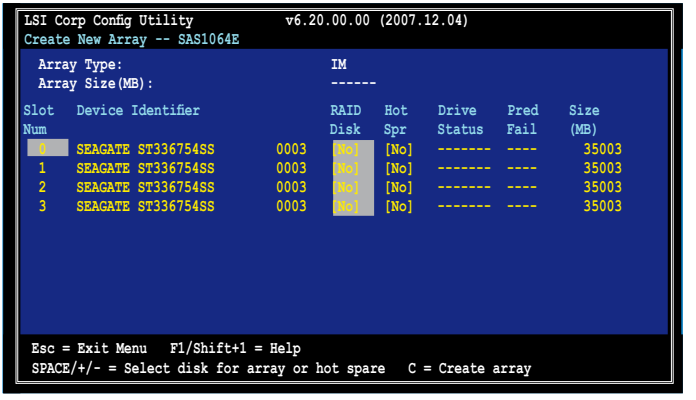


5. The **Select New Array Type** screen appears.
Use the arrow keys to select **Create IM Volume**, then press <Enter>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Select New Array Type -- SAS1064E
Create IM Volume
Create Integrated Mirror Array of 2 disks plus up to 2 optional hot spares. Data on the primary disk may be migrated.
Create IME Volume
Create Integrated Mirrored Enhanced Array of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on array disks will be DELETED!
Create IS Volume
Create Integrated Striping array of 2 to 10 disks. ALL DATA on array disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose array type to create

6. The **Create New Array** screen shows the disks you can add to make up the IM volume. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.

   You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the **Hot Spr** column, then press <+>, <->, or <Space>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Create New Array -- SAS1064E
Array Type: IM
Array Size(MB): ------
Slot Num | Device Identifier | RAID Disk | Hot Spr | Drive Status | Pred Fail | Size (MB)
0 SEAGATE ST336754SS 0003 [No] [No] ------- ---- 35003
1 SEAGATE ST336754SS 0003 [No] [No] ------- ---- 35003
2 SEAGATE ST336754SS 0003 [No] [No] ------- ---- 35003
3 SEAGATE ST336754SS 0003 [No] [No] ------- ---- 35003
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Select disk for array or hot spare C = Create array

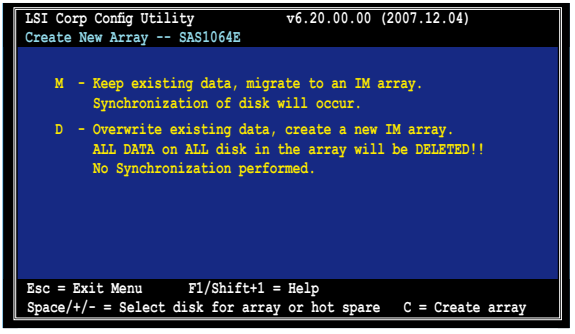
By default, the **RAID Disk** field shows **No** before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

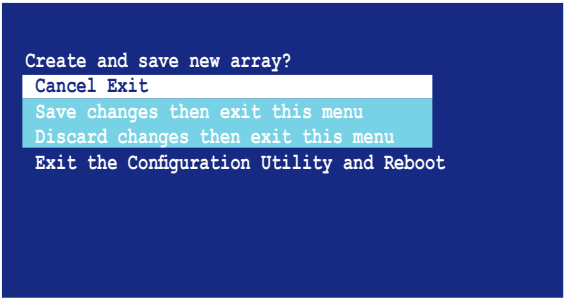
7. A confirmation screen appears.

   Press <M> to keep existing data on the first disk. If you choose this option, data on the first disk will be mirrored on the second disk that you will add to the volume later. Make sure the data you want to mirror is on the first disk.

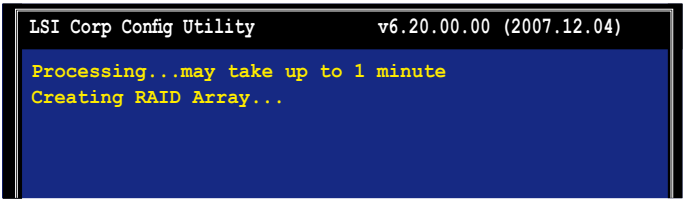
   Press <D> to overwrite any data and create the new IM array.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Create New Array -- SAS1064E
M - Keep existing data, migrate to an IM array.
Synchronization of disk will occur.
D - Overwrite existing data, create a new IM array.
ALL DATA on ALL disk in the array will be DELETED!!
No Synchronization performed.
Esc = Exit Menu F1/Shift+1 = Help
Space/+/- = Select disk for array or hot spare C = Create array

8. Repeat steps 5 and 6 to add the second disk to the volume.
9. When done, press <C> to create the array, then select **Save changes then exit this menu**.


Create and save new array?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot

10. The utility creates the array.

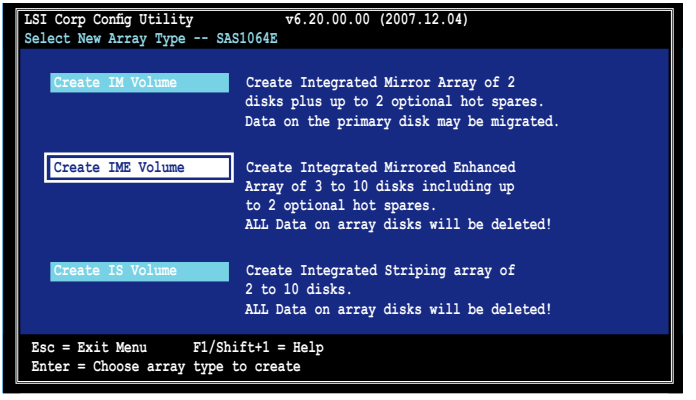


2.2.2 Integrated Mirroring Enhanced volume

The Integrated Mirroring Enhanced (IME) supports three to ten disks, or seven mirrored disks plus two hot spare disks.

To create an IME volume:

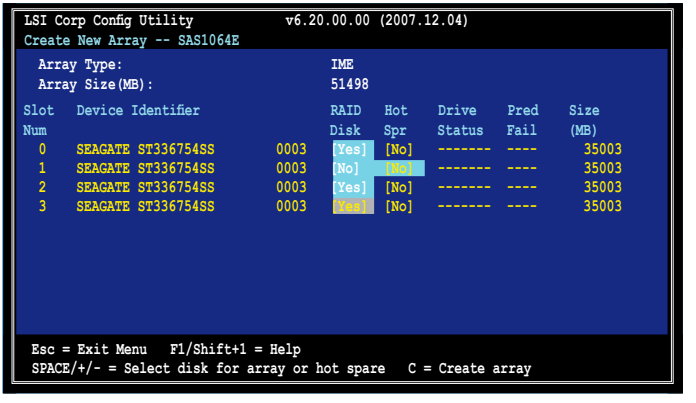
1. Follow steps 1–4 of the section **Integrated Mirroring volume**.
2. The **Select New Array Type** screen appears.
   Use the arrow keys to select **Create IME Volume**, then press <Enter>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Select New Array Type -- SAS1064E
Create IM Volume
Create Integrated Mirror Array of 2 disks plus up to 2 optional hot spares. Data on the primary disk may be migrated.
Create IME Volume
Create Integrated Mirrored Enhanced Array of 3 to 10 disks including up to 2 optional hot spares. ALL Data on array disks will be deleted!
Create IS Volume
Create Integrated Striping array of 2 to 10 disks. ALL Data on array disks will be deleted!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose array type to create

3. The **Create New Array** screen shows the disks you can add to make up the IME volume.

   Integrated Mirroring Enhanced (IME) supports three to ten disks, or seven mirrored disks plus two hot spare disks. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.

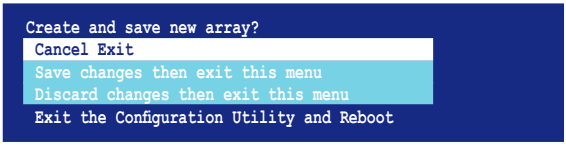
   You may also specify the Hot Spare disk here. Select the disk, then move the cursor to the **Hot Spr** column, then press <+>, <->, or <Space>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Create New Array -- SAS1064E
Array Type: IME
Array Size(MB): 51498
Slot Num Device Identifier RAID Disk Hot Spr Drive Status Pred Fail Size (MB)
0 SEAGATE ST336754SS 0003 [Yes] [No] ------- ---- 35003
1 SEAGATE ST336754SS 0003 [No] [No] ------- ---- 35003
2 SEAGATE ST336754SS 0003 [Yes] [No] ------- ---- 35003
3 SEAGATE ST336754SS 0003 [Yes] [No] ------- ---- 35003
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Select disk for array or hot spare C = Create array

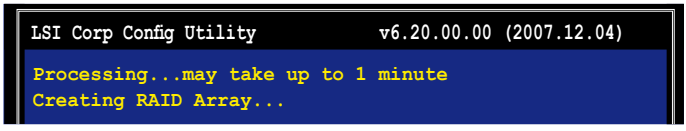
By default, the **RAID Disk** field shows **No** before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

4. Repeat step 3 to add the other disks to the volume.
5. When done, press <C> to create the array, then select **Save changes then exit this menu**.


Create and save new array?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot

6. The utility creates the array.

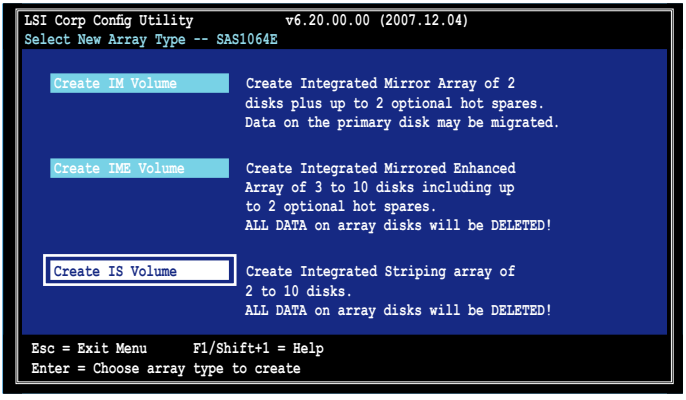


2.2.3 Integrated Striping (IS) volume

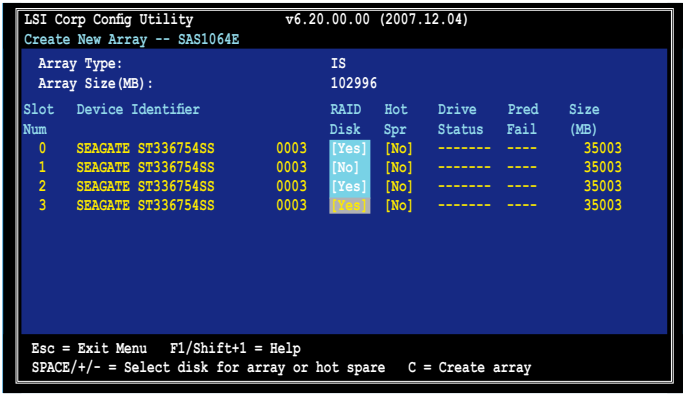
The Integrated Striping (IS) feature provides RAID 0 functionality, supporting volumes with two to ten disks. You may combine an IS volume with an IM or IME volume.

To create an IS volume:

1. Follow steps 1–4 of the section **Integrated Mirroring volume**.
2. The **Select New Array Type** screen appears.
   Use the arrow keys to select **Create IS Volume**, then press <Enter>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Select New Array Type -- SAS1064E
Create IM Volume
Create Integrated Mirror Array of 2 disks plus up to 2 optional hot spares. Data on the primary disk may be migrated.
Create IME Volume
Create Integrated Mirrored Enhanced Array of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on array disks will be DELETED!
Create IS Volume
Create Integrated Striping array of 2 to 10 disks. ALL DATA on array disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose array type to create

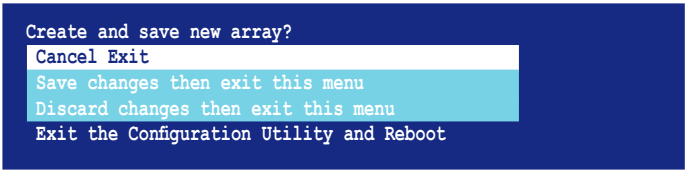
3. The **Create New Array** screen shows the disks you can add to make up the IS volume. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Create New Array -- SAS1064E
Array Type: IS
Array Size(MB): 102996
Slot Num | Device Identifier | RAID Disk | Hot Spr | Drive Status | Pred Fail | Size (MB)
0 SEAGATE ST336754SS 0003 [Yes] [No] ------- ---- 35003
1 SEAGATE ST336754SS 0003 [No] [No] ------- ---- 35003
2 SEAGATE ST336754SS 0003 [Yes] [No] ------- ---- 35003
3 SEAGATE ST336754SS 0003 [Yes] [No] ------- ---- 35003
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Select disk for array or hot spare C = Create array

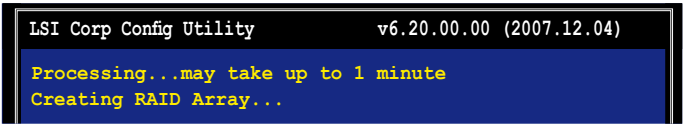
By default, the **RAID Disk** field shows **No** before array creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID array.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk has been selected as the Hot Spare for the RAID array.
- The disk is already part of another array.

4. Repeat step 3 to add the other disks to the volume.
5. When done, press <C> to create the array, then select **Save changes then exit this menu**.


Create and save new array?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot

6. The utility creates the array.



2.2.4 Managing Arrays

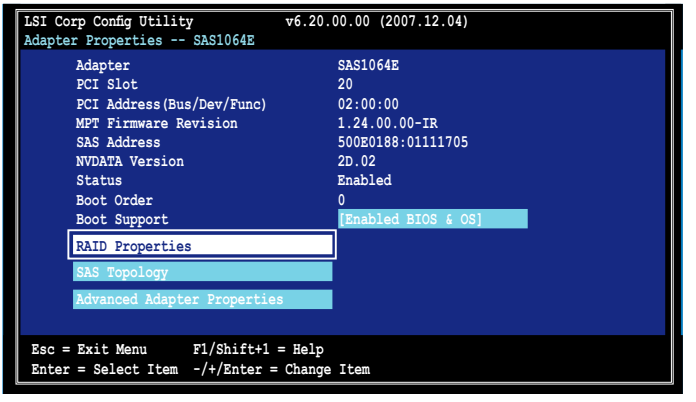
The LSI Corporation MPT Setup Utility allows you to perform other tasks related to configuring and maintaining IM and IME volumes.

Refer to this section to view volume properties, manage the hot spare disk, synchronize the array, activate the array, and delete the array.

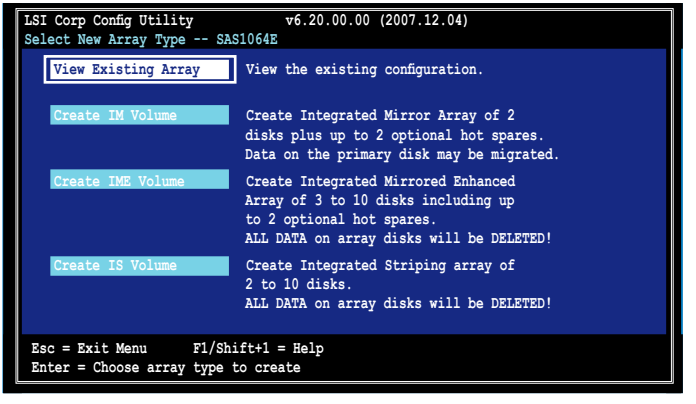
Viewing volume properties

To view volume properties:

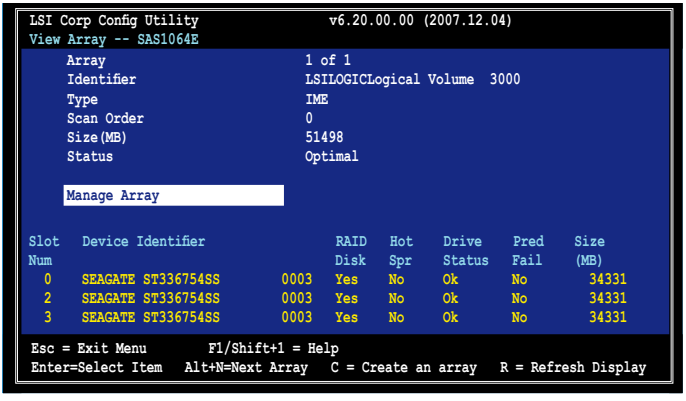
1. On the main menu, select **RAID Properties**.



2. On the next screen that appears, select **View Existing Array**.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Select New Array Type -- SAS1064E
View Existing Array
View the existing configuration.
Create IM Volume
Create Integrated Mirror Array of 2 disks plus up to 2 optional hot spares. Data on the primary disk may be migrated.
Create IME Volume
Create Integrated Mirrored Enhanced Array of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on array disks will be DELETED!
Create IS Volume
Create Integrated Striping array of 2 to 10 disks. ALL DATA on array disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose array type to create

3. The **View Array** screen appears. Here you can view properties of the RAID array(s) created. If you have configured a hot spare, it will also be listed. If you created more than one array, you may view the next array by pressing <Alt+N>.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
View Array -- SAS1064E
Array 1 of 1
Identifier LSILOGICLogical Volume 3000
Type IME
Scan Order 0
Size(MB) 51498
Status Optimal
Manage Array
Slot Num
Device Identifier
RAID Disk
Hot Spr
Drive Status
Pred Fail
Size (MB)
0 SEAGATE ST336754SS 0003 Yes No Ok No 34331
2 SEAGATE ST336754SS 0003 Yes No Ok No 34331
3 SEAGATE ST336754SS 0003 Yes No Ok No 34331
Esc = Exit Menu F1/Shift+1 = Help
Enter=Select Item Alt+N=Next Array C = Create an array R = Refresh Display

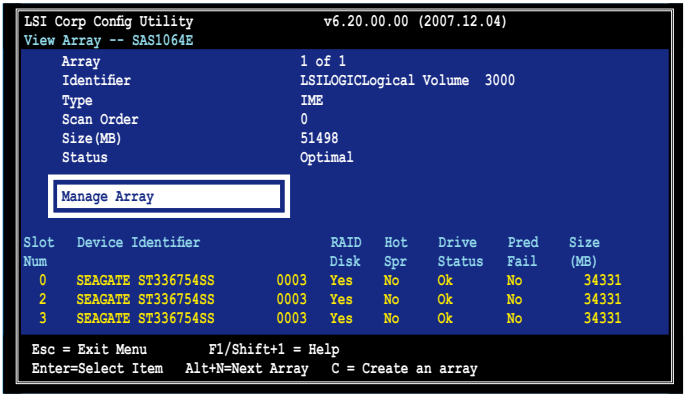
Managing hot spares

You may configure one disk as a global hot spare to protect critical data on the IM/IME volume(s). You may create the hot spare disk at the same time you create the IM/IME volume. Refer to this section when adding a hot spare disk on an existing volume.

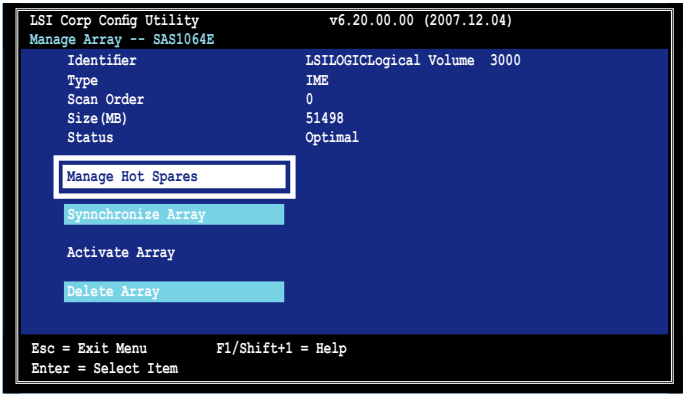
If a disk on an IM/IME volume fails, the utility automatically rebuilds the failed disk data on the hot spare. When the failed disk is replaced, the utility assigns the replacement as the new hot spare.

To create a hot spare:

1. Follow steps 1–3 of the section **Viewing volume properties**.
2. From the **View Array** screen, select **Manage Array**, then press <Enter>.

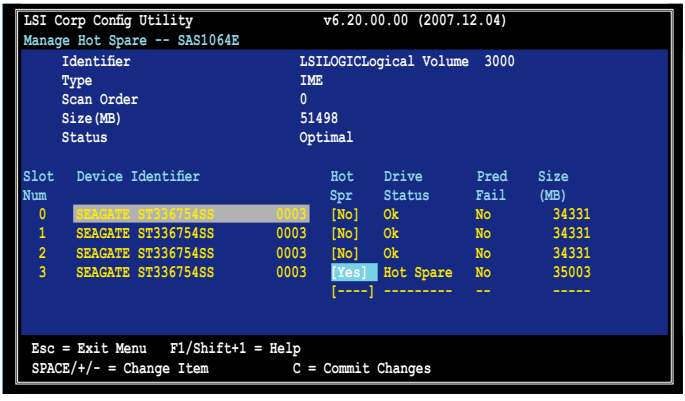

LSI Corp Config Utility v6.20.00.00 (2007.12.04)
View Array -- SAS1064E
Array 1 of 1
Identifier LSILOGICLogical Volume 3000
Type IME
Scan Order 0
Size(MB) 51498
Status Optimal
Manage Array
Slot Num
Device Identifier
RAID Disk
Hot Spr
Drive Status
Pred Fail
Size (MB)
0 SEAGATE ST336754SS 0003 Yes No Ok No 34331
2 SEAGATE ST336754SS 0003 Yes No Ok No 34331
3 SEAGATE ST336754SS 0003 Yes No Ok No 34331
Esc = Exit Menu F1/Shift+1 = Help
Enter=Select Item Alt+N=Next Array C = Create an array

3. From the **Manage Array** screen, select **Manage Hot Spares**, then press <Enter>.



4. Use the arrow key to select the disk you would like to configure as hot spare, then move the cursor to the **Hot Spr** column. Press <+>, <->, or <Space>. The **Drive Status** column field now shows **Hot Spare**.

   Press <C> to commit the changes.

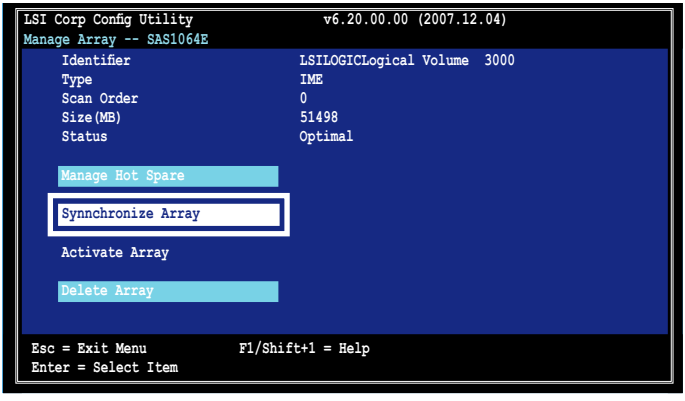

LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Manage Hot Spare -- SAS1064E
Identifier LSILOGICLogical Volume 3000
Type IME
Scan Order 0
Size(MB) 51498
Status Optimal
Slot Num
Device Identifier
Hot Spr
Drive Status
Pred Fail
Size (MB)
0 SEAGATE ST336754SS 0003 [No] Ok No 34331
1 SEAGATE ST336754SS 0003 [No] Ok No 34331
2 SEAGATE ST336754SS 0003 [No] Ok No 34331
3 SEAGATE ST336754SS 0003 [Yes] Hot Spare No 35003
[----] --------- -- -----
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Change Item C = Commit Changes

Synchronizing the array

Synchronizing the array allows the utility to resynchronize data on the mirrored disk in the array. This procedure is seldom required because data synchronization is automatically done during normal operation.

To synchronize the array:

1. Follow steps 1–3 of the section **Viewing volume properties** and step 2 of the section **Managing hot spares**.
2. From the **Manage Array** screen select **Synchronize Array**, then press <Enter>.



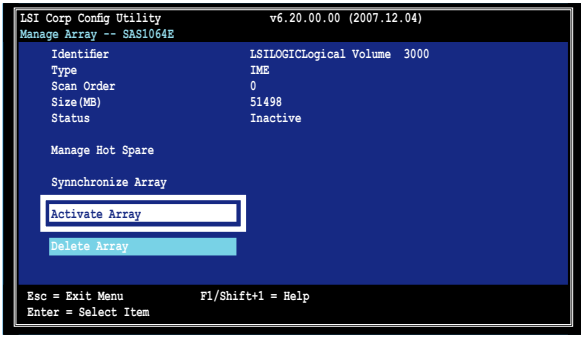
3. Press <Y> to begin the synchronization, or <N> to cancel.

Activating an array

If an array is removed from one controller/computer or moved to another, the array is considered inactive. When you add the array back to the system, you may reactivate the array.

To activate the array:

1. From the **Manage Array** screen, select **Activate Array**, then press <Enter>.



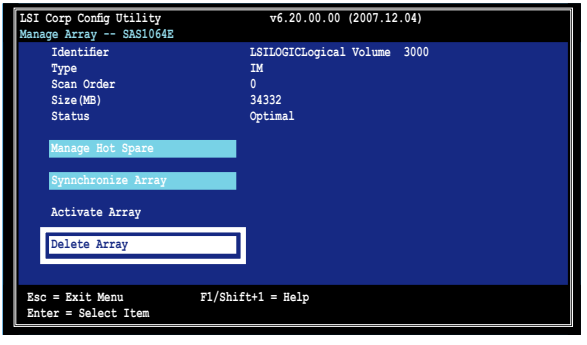
2. Press <Y> to activate, or <N> to cancel.

Deleting an array

- You cannot recover lost data if you delete an array. Make sure you back up important data before deleting an array.
- If you delete an IM (RAID 1) volume, the data is preserved on the primary disk.

To delete an array:

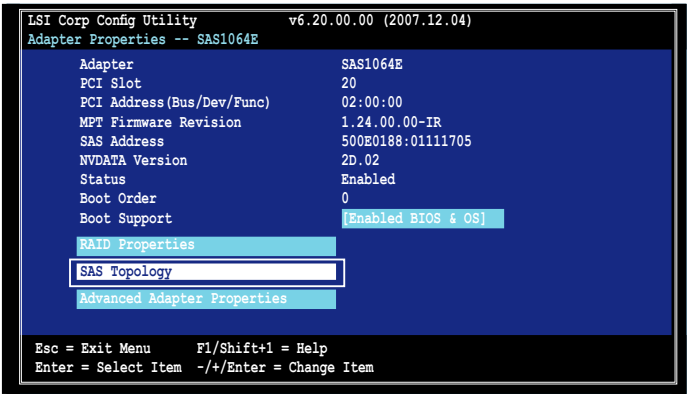
1. From the **Manage Array** screen, select **Delete Array**, then press <Enter>.



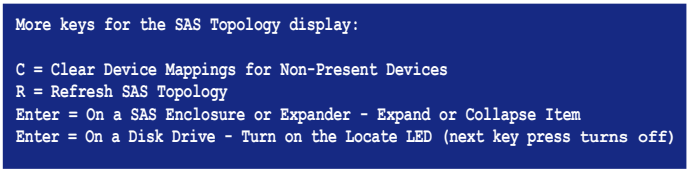
2. Press <Y> to delete, or <N> to cancel.

2.2.5 Viewing SAS topology

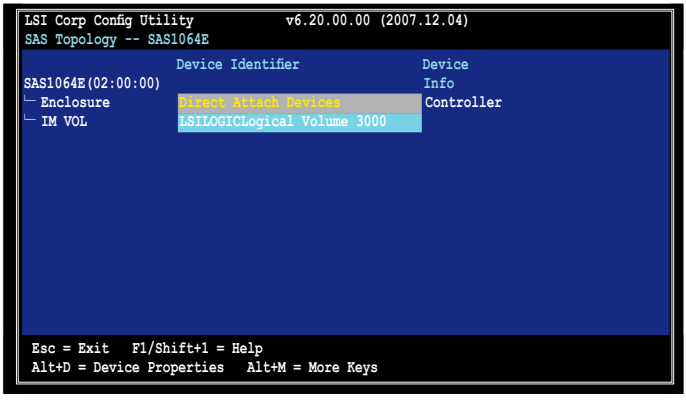
1. From the **Adapter Properties** screen, select **SAS Topology**.



Press <Alt+D> to display device properties, or <Alt+M> to display more keys.

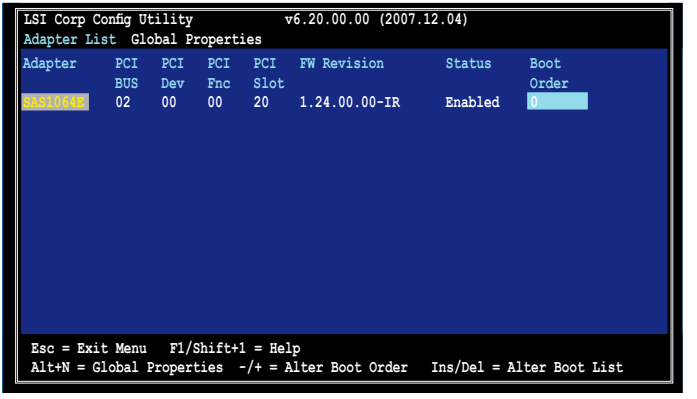

More keys for the SAS Topology display:
C = Clear Device Mappings for Non-Present Devices
R = Refresh SAS Topology
Enter = On a SAS Enclosure or Expander - Expand or Collapse Item
Enter = On a Disk Drive - Turn on the Locate LED (next key press turns off)

2. Information about the volume and its member-disks are then displayed.



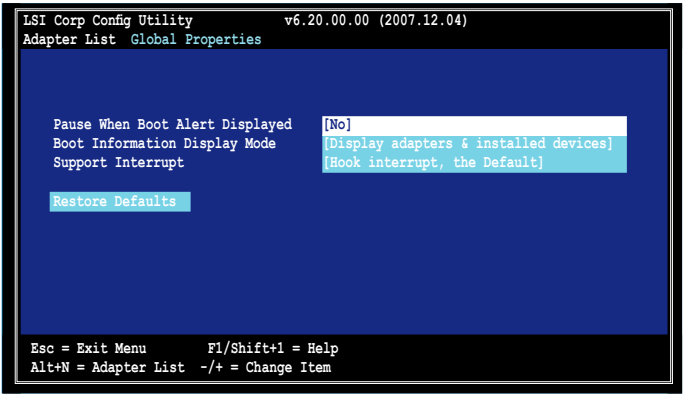
2.2.6 Global Properties

From the **Adapter List** screen, press <Alt+N> to enter **Global Properties** menu. From the menu you may change related settings.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Adapter PCI BUS PCI Dev PCI Fnc PCI Slot FW Revision Status Boot Order
SAS1064E 02 00 00 20 1.24.00.00-IR Enabled 0
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List

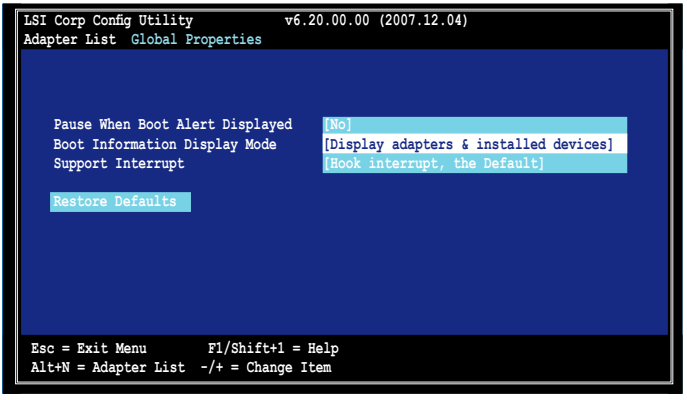
Pause When Boot Alert Displayed

Sets whether to pause or not when the boot alert displays.
Configuration options: [Yes] [No]


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Pause When Boot Alert Displayed [No]
Boot Information Display Mode [Display adapters & installed devices]
Support Interrupt [Hook interrupt, the Default]
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

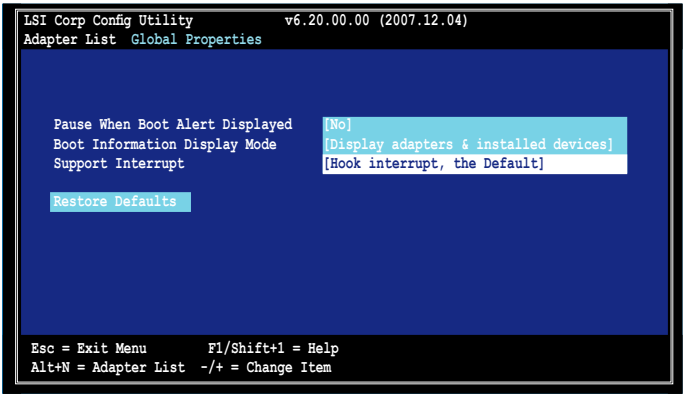
Boot Information Display Mode

Sets the disk information display mode.
Configuration options: [Display adapters & installed devices]
[Display adapters only] [Display adapters and all devices]
[Display minimal information]


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Pause When Boot Alert Displayed [No]
Boot Information Display Mode [Display adapters & installed devices]
Support Interrupt [Hook interrupt, the Default]
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

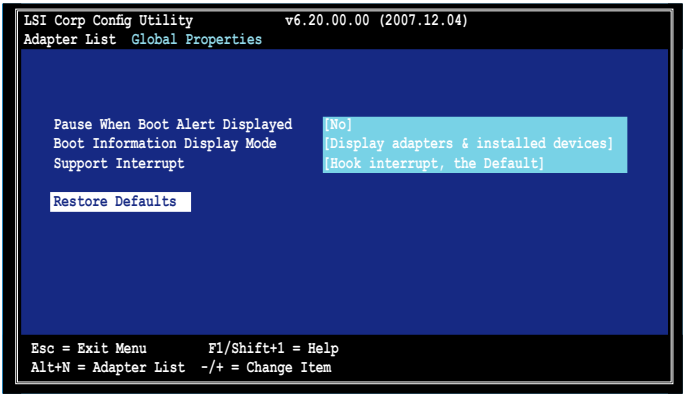
Support Interrupt

Configuration options: [Hook interrupt, the Default] [Bypass interrupt hook]


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Pause When Boot Alert Displayed [No]
Boot Information Display Mode [Display adapters & installed devices]
Support Interrupt [Hook interrupt, the Default]
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

Restore Defaults

This option allows you to discard the selections you made and restore the system defaults.


LSI Corp Config Utility v6.20.00.00 (2007.12.04)
Adapter List Global Properties
Pause When Boot Alert Displayed [No]
Boot Information Display Mode [Display adapters & installed devices]
Support Interrupt [Hook interrupt, the Default]
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

2.3 MegaRAID Storage Manager

MegaRAID Storage Manager software enables you to configure, monitor, and maintain storage configurations on LSI SAS controllers. The MegaRAID Storage Manager graphical user interface (GUI) makes it easy for you to create and manage storage configurations.

2.3.1 Hardware and Software Requirements

The hardware requirements for MegaRAID Storage Manager software are as follows:

- PC-compatible computer with an IA-32 (32-bit) Intel Architecture processor or an EM64T (64-bit) processor and at least 128 Mbytes of system memory (256 Mbytes recommended)
- Disk drive with at least 50 Mbytes available free space

The supported operating systems for the MegaRAID Storage Manager software are as follows:

- Microsoft Windows 2000, Microsoft Windows Server 2003, Microsoft Windows XP, and Microsoft Windows Vista
- Red Hat Linux 3.0, 4.0, or 5.0
- SUSE SLES 9 and 10, with latest updates and service packs

Refer to your server documentation and to the operating system documentation for more information on hardware and operating system requirements.

2.3.2 Installing MegaRAID Storage Manager Sofware on Microsoft Windows OS

Follow these steps if you need to install MegaRAID Storage Manager software on a system running Microsoft Windows OS:

1. Insert the MegaRAID Storage Manager software installation CD in the CD-ROM drive.

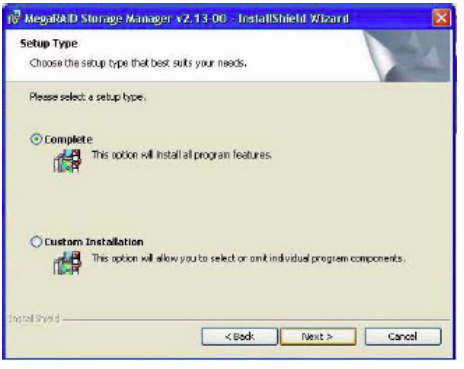
   If necessary, find and double-click the setup.exe file to start the installation program.
2. When the Welcome screen appears, click **Next**.

   If MegaRAID Storage Manager software is already installed on this system, the Program Maintenance screen appears. Read the screen text and select **Modify**, **Repair**, or **Remove**.
3. When the next screen appears, read and accept the user license, and click **Next**.

   The Customer Information screen appears, as shown in the following figure.

4. Enter your user name and organization name. In the bottom part of the screen, select an installation option:
   – If you select **All users**, any user with administrative privileges can use this version of MegaRAID Storage Manager software to view or change storage configurations.
   – If you select **Only for current user**, the MegaRAID Storage Manager shortcuts and associated icons will be available only to the user with this user name.
5. Click **Next** to continue.
6. On the next screen, accept the default Destination Folder, or click **Change** to select a different destination folder. Click **Next** to continue.

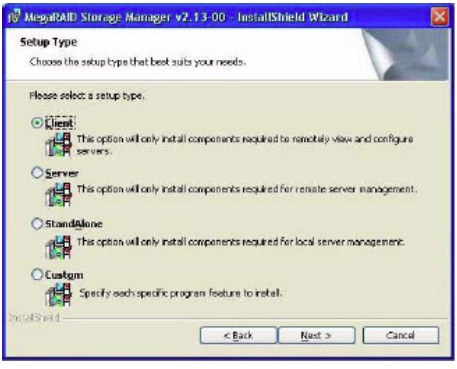
   The Setup Type screen appears, as shown in the following figure.


MegaRAID Storage Manager v2.13-00 - InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
Please select a setup type.
Complete
This option will install all program features.
Custom Installation
This option will allow you to select or omit individual program components.
InstallShield
< Back
Next >
Cancel

7. Select one of the Setup options. The options are fully explained in the screen text.
   - Normally, you would select **Complete** if you are installing MegaRAID Storage Manager software on a server.
   - Select **Custom Installation** if you want to select individual program components.
8. Click **Next** to continue.

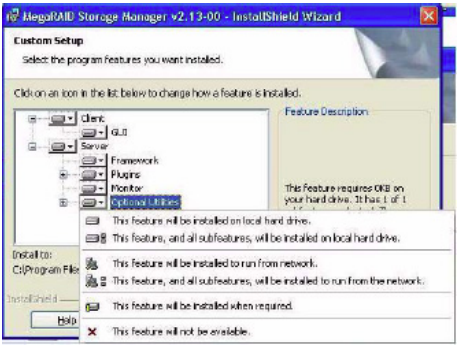
   If you selected **Custom Installation** as your setup option, the second Setup Type screen appears, as shown in the following figure.

   If you select **Complete** as your setup option, the Installation Wizard is ready to install MSM. To begin installation, click on Install on the next screen that appears.


MegaRAID Storage Manager v2.13-00 - InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
Please select a setup type.
Client
This option will only install components required to remotely view and configure servers.
Server
This option will only install components required for remote server management.
StandAlone
This option will only install components required for local server management.
Custom
Specify each specific program feature to install.
InstallShield
< Back
Next >
Cancel

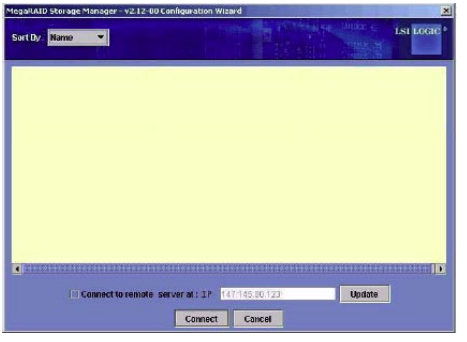
9. Select one of the custom setup options. The options are fully explained in the screen text.
   - Select **Client** if you are installing MegaRAID Storage Manager software on a PC that will be used to view and configure servers over a network. To begin installation, click on **Install** on the next screen that appears.
   - Select **Server** to install only those components required for remote server management. To begin installation, click on **Install** on the next screen that appears.
   - Select **StandAlone** if you will use MegaRAID Storage Manager software to create and manage storage configurations on a standalone workstation. To begin installation, click on **Install** on the next screen that appears.
   - Select **Custom** if you want to specify individual program features to install.

   If you select **Custom**, a window listing the installation features appears, as shown in the following figure. Select the features you want on this screen.


MegaRAID Storage Manager v2.13-00 - InstallShield Wizard
Custom Setup
Select the program features you want installed.
Click on an icon in the list below to change how a feature is installed.
Client
GUI
Server
Framework
Plugins
Monitor
Optional Utilities
Feature Description
This feature will be installed on local hard drive.
This feature, and all subfeatures, will be installed on local hard drive.
This feature will be installed to run from network.
This feature, and all subfeatures, will be installed to run from the network.
This feature will be installed when required.
This feature will not be available.
Install to:
InstallShield
Help

10. Click **Next** to proceed.
11. Click **Install** to install the program.
12. When the final Configuration Wizard screen appears, click **Finish**.

    If you select **Client** installation for a PC used to monitor servers, and if there are no available servers with a registered framework on the local subnet (that is, servers with a complete installation of MegaRAID Storage Manager software), the server screen will appear, as shown in the following figure. The server screen will not list any servers. You can use this screen to manage systems remotely.



2.3.3 Installing MegaRAID Storage Manager Sofware for Linux

Follow these steps if you need to install MegaRAID Storage Manager software on a system running Red Hat Linux or SUSE Linux:

1. Copy the **MSM_linux_installer...tar.gz** file to a temporary folder.
2. Untar the **MSM_linux_installer...tar.gz** file using the following command:

   tar -zxvf MSM_linux_installer...tar.gz

   A new **disk** directory is created.
3. Go to the new **disk** directory.
4. In the **disk** directory, find and read the **readme.txt** file.
5. To start the installation, enter the following command:

   csh install.sh -a

If you select **Client** installation for a PC used to monitor servers, and if there are no available servers with a registered framework on the local subnet (that is, servers with a complete installation of MegaRAID Storage Manager software), the server screen appears. The server screen does not list any servers. You can use this screen to manage systems remotely.

2.3.4 Linux Error Messages

The following messages may appear while you are installing MegaRAID Storage Manager software on a Linux system:

- **More than one copy of MegaRAID Storage Manager software has been installed.**

  This message indicates that the user has installed more than one copy of MegaRAID Storage Manager software. (This can be done by using the rpm-force command to install the rpm file directly, which is not recommended, instead of using the install.sh file.) In such cases, the user must uninstall all the rpm files manually before installing MegaRAID Storage Manager software with the procedure listed previously.

- **The version is already installed.**

  This message indicates that the version of MegaRAID Storage Manager software you are trying to install is already installed on the system.

- **The installed version is newer.**

  This message indicates that a version of MegaRAID Storage Manager software is already installed on the system, and it is a newer version than the version you are trying to install.

- **Exiting installation.**

  This is the message that appears when the installation is complete.

- **RPM installation failed.**

  This message indicates that the installation failed for some reason. Additional message text explains the cause of the failure.

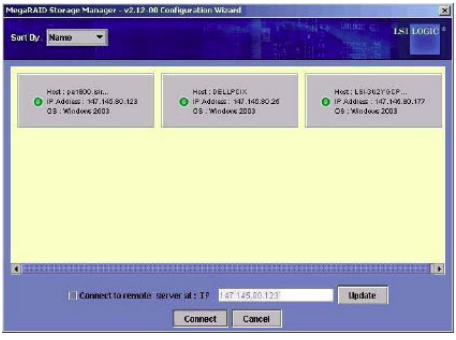
2.3.5 Starting MegaRAID Storage Manager Software

Follow these steps to start MegaRAID Storage Manager software and view the main window:

1. Start the program using the method required for your operating system environment:
   – To start MegaRAID Storage Manager software on a Microsoft Windows system, select **Start > Programs > MegaRAID Storage Manager > StartupUI**, or double-click the MegaRAID Storage Manager shortcut on the desktop.

   If a warning appears stating that Windows Firewall has blocked some features of the program, click **Unblock** to allow MegaRAID Storage Manager software to start. (The Windows Firewall sometimes blocks the operation of programs that use Java.)

   – To start MegaRAID Storage Manager software on a Red Hat Linux system, select **Applications > System Tools > MegaRAID Storage Manager StartupUI**.
   – To start MegaRAID Storage Manager software on a SUSE SLES 9 system, select **Start > System > More Programs > MegaRAID Storage Manager**.
2. When the program starts, the Select Server window appears, as shown in the following figure.



If the circle in the server icon is yellow instead of green, it means that the server is running in a degraded state—for example, because a disk drive used in a virtual disk has failed. If the circle is red, the storage configuration in the server has failed.

To access servers on a different subnet, type in the box at the bottom of the screen the IP address of a server in the desired subnet where the MegaRAID Storage Manager software is running, and click **Update**. If you check the **Connect to remote server at: IP** address box, you can also access a standalone (remote) installation of MegaRAID Storage Manager software, if it has a network connection.

3. Double-click the icon of the server that you want to access. The Server Login window appears, as shown in the following figure.

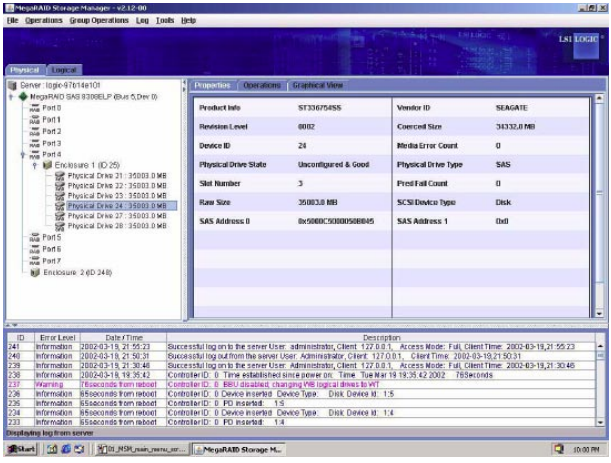
4. Select an access mode from the drop-down menu.
   – Select **Full Access** if you need to both view the current configuration and change the configuration.
   – Select **View Only** if you need to only view and monitor the configuration.
5. Enter your user name and password, and click **Login**.

If the computer is networked, this is the login to the computer itself, not the network login.

You must enter the root/administrator user name and password to use Full Access mode. If your user name and password are correct for the Login mode you have chosen, the main MegaRAID Storage Manager window appears.

2.3.6 MegaRAID Storage Manager Window

This section describes the MegaRAID Storage Manager window, which is shown in the following figure.



Physical/Logical View Panel

The left panel of the MegaRAID Storage Manager window displays either the Physical view or the Logical view of the system and the devices in it, depending on which tab is selected.

- The Physical view shows the hierarchy of physical devices in the system. At the top of the hierarchy is the system itself. One or more controllers are installed in the system. The controller label identifies the MegaRAID controller, such as the ASUS PIKE 1064E/1068E controller, so that you can easily differentiate between multiple controllers. Each controller has one or more ports. Disk drives and other devices are attached to the ports.
- The Logical view shows the hierarchy of controllers, virtual disks, and disk groups that are defined on the system. (Physical drives also appear in the Logical view, so you can see which physical drives are used by each virtual disk.)

The following icons in the left panel represent the controllers, disk drives, and other devices:

- System
- Controller
- Port

- Array
- Virtual disk
- Physical drive
- Enclosure

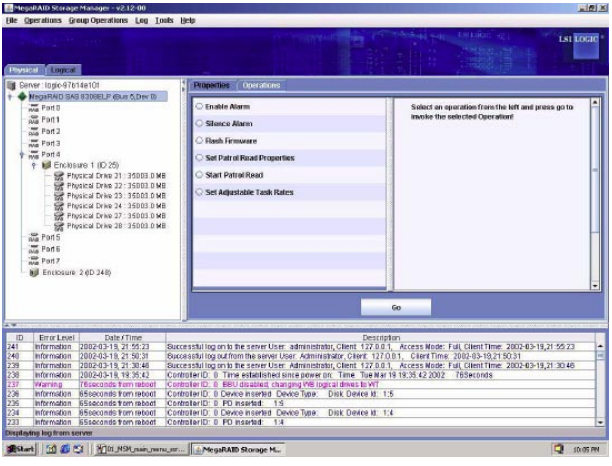
A red circle to the right of an icon indicates that the device has failed. For example, this icon indicates that a physical drive has failed: .

A yellow circle to the right of an icon indicates that a device is running in a degraded state. For example, this icon indicates that a virtual disk is running in a degraded state because a disk drive has failed: .

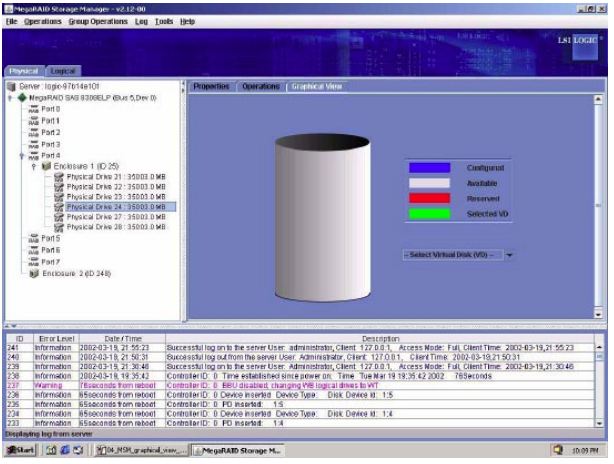
Properties/Operations/Graphical View Panel

The right panel of the MegaRAID Storage Manager window has either two or three tabs, depending on what kind of device is selected in the left panel.

- The **Properties** tab displays information about the selected device. For example, if a controller icon is selected in the left panel, the Properties tab lists information such as the controller name, NVRAM size, and device port count.
- The **Operations** tab lists the operations that can be performed on the device that is selected in the left panel. For example, the following figure shows the options that are available when a controller is selected. These include enabling or silencing the alarm and running a Patrol Read. Some types of devices, such as arrays and ports, do not have operations associated with them.



- The **Graphical View** tab can be selected in the right panel if a physical drive, virtual disk, or disk enclosure is selected in the left panel. In graphical view, the device's storage capacity is color coded according to the legend shown on the screen. For example, on a physical drive configured space is blue, available space is white, and reserved space is red, as shown in the following figure.


MegaRAID Storage Manager - v2.12-00
File Operations Group Operations Log Tools Help
LSI LOGIC
Physical Logical
Server : logic-97614a101
MegaRAID SAS 8300ELP (Bus 5,Dev 0)
Port 0
Port 1
Port 2
Port 3
Port 4
Enclosure 1 (ID 25)
Physical Drive 21 : 35003.0 MB
Physical Drive 22 : 35003.0 MB
Physical Drive 23 : 35003.0 MB
Physical Drive 24 : 35003.0 MB
Physical Drive 27 : 35003.0 MB
Physical Drive 28 : 35003.0 MB
Port 5
Port 6
Port 7
Enclosure 2 (ID 248)
Properties Operations Graphical View
Configured
Available
Reserved
Selected VD
-- Select Virtual Disk (VD) --
ID Error Level Date / Time Description
241 Information 2002-03-19, 21:55:23 Successful log on to the server User: administrator, Client: 127.0.0.1, Access Mode: Full, Client Time: 2002-03-19,21:55:23
240 Information 2002-03-19, 21:50:31 Successful log out from the server User: Administrator, Client: 127.0.0.1, Client Time: 2002-03-19,21:50:31
239 Information 2002-03-19, 21:30:46 Successful log on to the server User: Administrator, Client: 127.0.0.1, Access Mode: Full, Client Time: 2002-03-19,21:30:46
238 Information 2002-03-19, 19:35:42 Controller ID: 0 Time established since power on: Time: Tue Mar 19 19:35:42 2002 785seconds
237 Warning 785seconds from reboot Controller ID: 0 BBU disabled; changing WB logical drives to WT
236 Information 65seconds from reboot Controller ID: 0 Device inserted: Device Type: Disk Device Id: 1:5
235 Information 65seconds from reboot Controller ID: 0 PD inserted: 1:5
234 Information 65seconds from reboot Controller ID: 0 Device inserted: Device Type: Disk Device Id: 1:4
233 Information 65seconds from reboot Controller ID: 0 PD inserted: 1:4
Displaying log from server
Start
04_MSM_graphical_view_...
MegaRAID Storage M...
10:09 PM

Event Log Panel

The lower part of the MegaRAID Storage Manager window displays the system event log entries. New event log entries appear during the session. Each entry has an ID, a timestamp and date, an error level indicating the severity of the event, and a brief description of the event.

Menu Bar

Here are brief descriptions of the main selections on the MegaRAID Storage Manager menu bar.

File Menu

The File menu has an Exit option for exiting from the MegaRAID Storage Manager software. It also has a Rescan option for updating the display in the MegaRAID Storage Manager window. (Rescan is seldom required; the display normally updates automatically.)

Operations Menu

The Operations menu is available when a controller, physical drive, or virtual disk is selected in the MegaRAID Storage Manager window. The Operations menu options vary depending on what type of device is selected in the left panel of the MegaRAID Storage Manager window. For example, the Scan for Foreign Config option is available only when a controller is selected. The options also vary depending on the current state of the selected device. For example, if you select an offline physical drive, the Make Drive Online option appears in the Operations menu.

You can also view the Operations selections on the main window on the Operations tab in the right panel. If an operation requires user inputs before it can be executed, it appears in the Operations tab but not in the Operations menu. A device-specific Operations menu pops up if you right-click a device icon in the left panel.

Configuration options are also available. This is where you access the Configuration Wizard and other configuration-related commands. To access the other configuration commands, select **Operations > Configuration**.

Group Operations Menu

The Group Operations menu options include Check Consistency, Initialize, and Show Progress.

Tools Menu

On the Tools menu you can select **Configure > Monitor** Configurator to access the Event Configuration Notification screen, which you can use to set the alert delivery rules, event severity levels, exceptions, and email settings.

Log Menu

The Log menu includes options for saving and clearing the message log.

Help Menu

On the Help menu you can select **Help > Help** to view the MegaRAID Storage Manager online help file. You can select **Help > About** to view version information for the MegaRAID Storage Manager software.

- When you use the MegaRAID Storage Manager online help, you may see a warning message that Internet Explorer has restricted the file from showing active content. If this warning appears, click on the active content warning bar and enable the active content.
- If you are using the Linux operating system, you must install Firefox® or Mozilla® for the MegaRAID Storage Manager online help to display.

This chapter provides instructions for installing the RAID drivers on different operating systems.

3 Driver installation

3.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides instructions on how to install or update the RAID card drivers.

The RAID card driver might be included in the Linux OS installation CD, and could be loaded automatically during OS installation. However, we recommend using the RAID driver packaged in the RAID card support CD for better reliability.

3.1.1 Creating a RAID driver disk

You may have to use another system to create the RAID driver disk from the RAID card support CD or from the Internet.

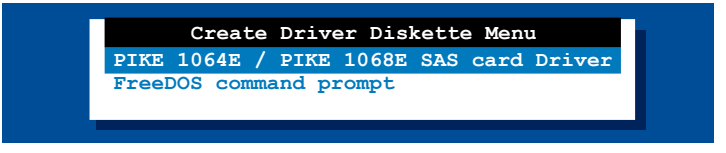
A floppy disk with the RAID driver is required when installing Windows® Server 2003 or Linux operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD).

To create a RAID driver disk in DOS environment:

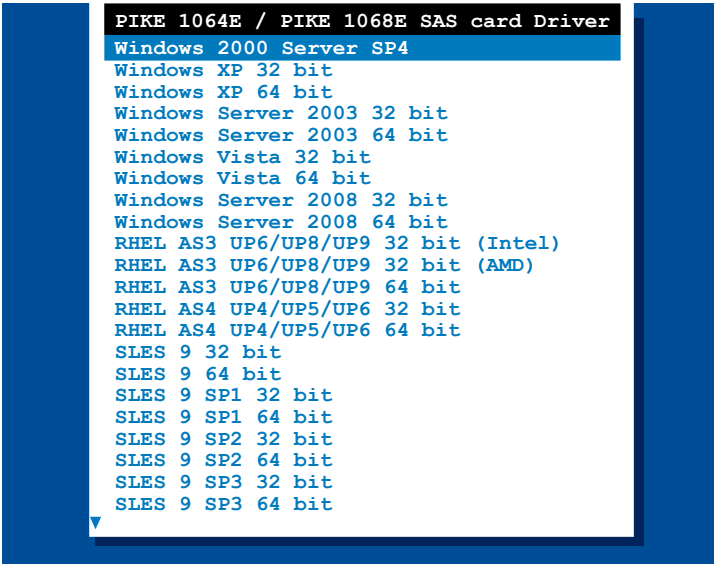
1. Place the RAID card support CD in the optical drive.
2. Restart the computer, then enter the BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support CD. Save your changes, then exit the BIOS Setup.
4. Restart the computer.
5. Press any key when prompted to boot from CD.

```
Loading FreeDOS FAT KERNEL GO!
Press any key to boot from CDROM...
```

6. The Makedisk menu appears. Select **PIKE 1064E / PIKE 1068E SAS card Driver,** and press <Enter> to enter the sub-menu.



7. Use the arrow keys to select the type of RAID driver disk you want to create.


PIKE 1064E / PIKE 1068E SAS card Driver
Windows 2000 Server SP4
Windows XP 32 bit
Windows XP 64 bit
Windows Server 2003 32 bit
Windows Server 2003 64 bit
Windows Vista 32 bit
Windows Vista 64 bit
Windows Server 2008 32 bit
Windows Server 2008 64 bit
RHEL AS3 UP6/UP8/UP9 32 bit (Intel)
RHEL AS3 UP6/UP8/UP9 32 bit (AMD)
RHEL AS3 UP6/UP8/UP9 64 bit
RHEL AS4 UP4/UP5/UP6 32 bit
RHEL AS4 UP4/UP5/UP6 64 bit
SLES 9 32 bit
SLES 9 64 bit
SLES 9 SP1 32 bit
SLES 9 SP1 64 bit
SLES 9 SP2 32 bit
SLES 9 SP2 64 bit
SLES 9 SP3 32 bit
SLES 9 SP3 64 bit

8. Place a blank, high-density floppy disk to the floppy disk drive.
9. Press <Enter>.
10. Follow screen instructions to create the driver disk.

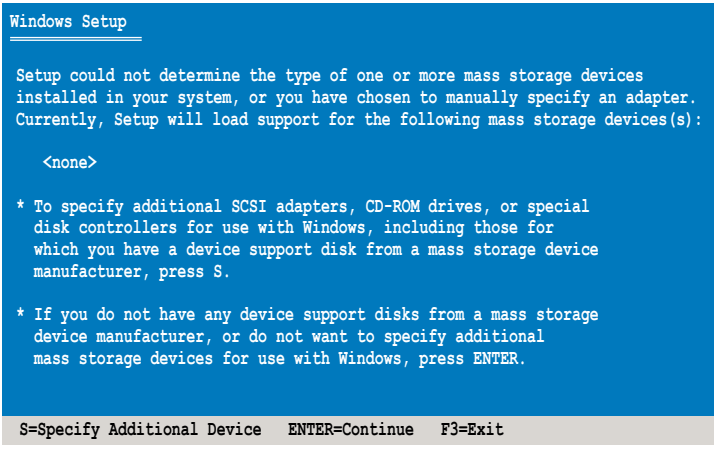
3.1.2 Windows® Server 2003 OS

During Windows® Server 2003 OS installation

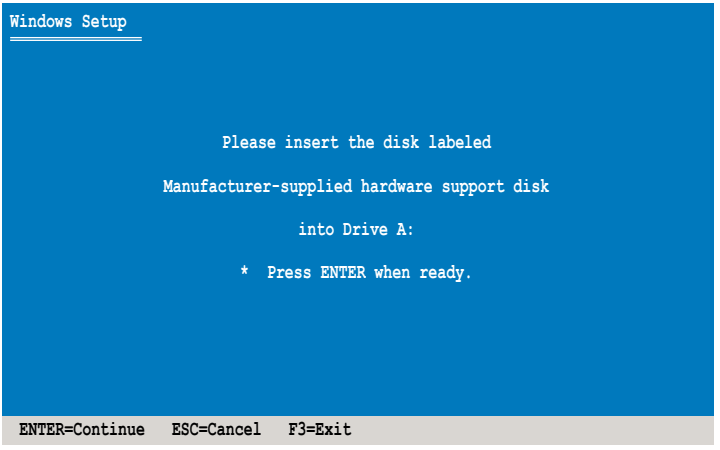
To install the RAID card driver when installing Windows® Server 2003 OS:

1. Boot the computer using the Windows® Server 2003 OS installation CD. The **Window® Setup** starts.
2. Press <F6> when the message "Press F6 if you need to install a third party SCSI or RAID driver..." appears at the bottom of the screen.

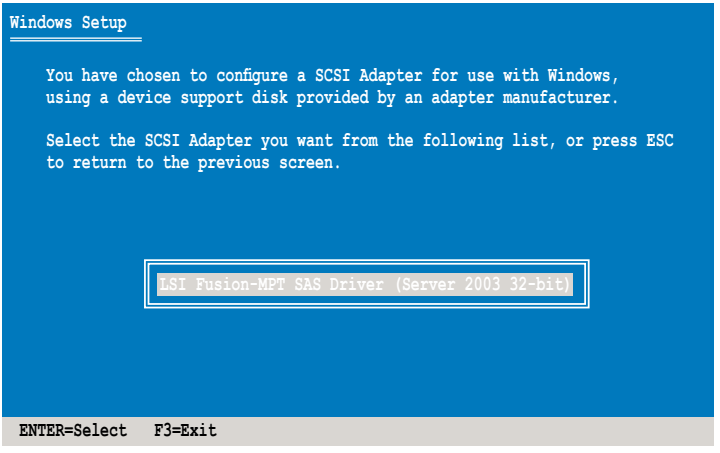
3. The next screen appears. Press <S> to specify an additional device.


Windows Setup
Setup could not determine the type of one or more mass storage devices installed in your system, or you have chosen to manually specify an adapter. Currently, Setup will load support for the following mass storage devices(s):
<none>
* To specify additional SCSI adapters, CD-ROM drives, or special disk controllers for use with Windows, including those for which you have a device support disk from a mass storage device manufacturer, press S.
* If you do not have any device support disks from a mass storage device manufacturer, or do not want to specify additional mass storage devices for use with Windows, press ENTER.
S=Specify Additional Device ENTER=Continue F3=Exit

4. Insert the RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



5. Select **LSI Fusion-MPT SAS Driver (Server 2003 32-bit)**, then press <Enter>.


Windows Setup
You have chosen to configure a SCSI Adapter for use with Windows, using a device support disk provided by an adapter manufacturer.
Select the SCSI Adapter you want from the following list, or press ESC to return to the previous screen.
LSI Fusion-MPT SAS Driver (Server 2003 32-bit)
ENTER=Select F3=Exit

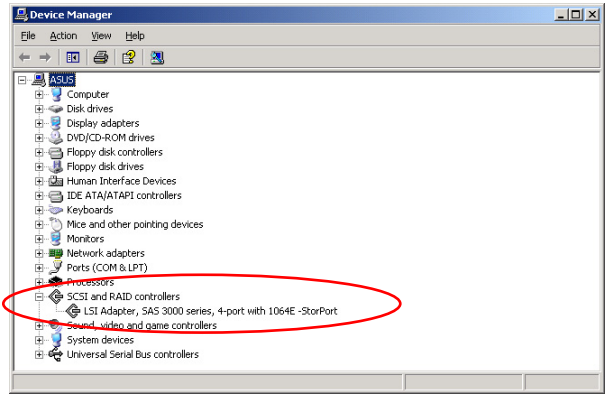
6. The Windows® Setup loads the RAID card drivers from the RAID driver disk. When next screen appears, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

After Windows® Server 2003 OS installation

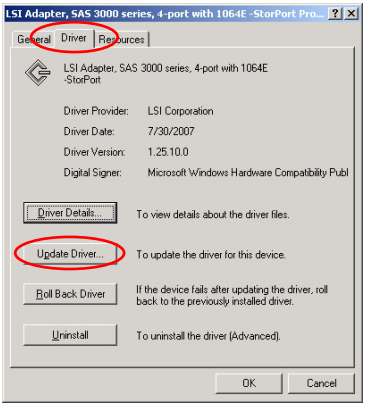
To update the RAID card driver after installing Windows® Server 2003 OS:

1. Right-click the **My Computer** icon on the desktop and select **Properties** from the menu.
2. Click the **Hardware** tab on the top, then click the **Device Manager** button.
3. Double-click the **LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort** item.

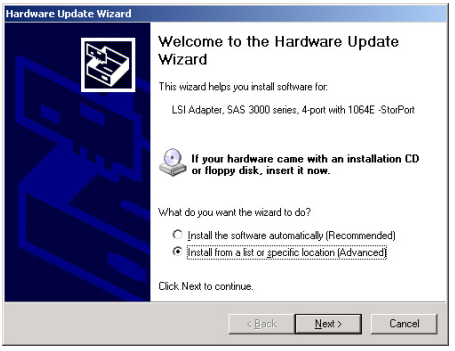
The controller name differs according to the installed SAS RAID card.



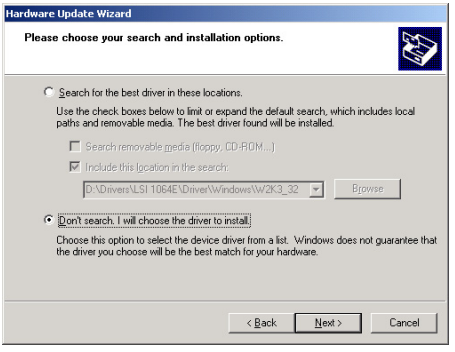
4. Click the **Driver** tab on the top, then click **Update Driver**.


LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort Pro...
General
Driver
Resources
LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort
Driver Provider: LSI Corporation
Driver Date: 7/30/2007
Driver Version: 1.25.10.0
Digital Signer: Microsoft Windows Hardware Compatibility Publ
Driver Details...
To view details about the driver files.
Update Driver...
To update the driver for this device.
Roll Back Driver
If the device fails after updating the driver, roll back to the previously installed driver.
Uninstall
To uninstall the driver (Advanced).
OK
Cancel

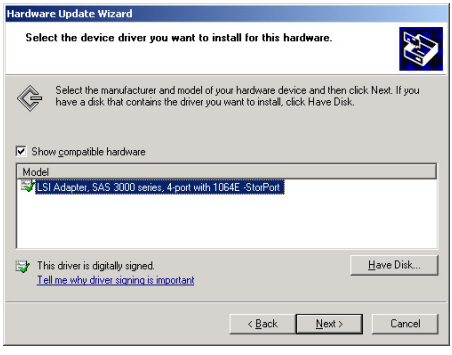
5. Toggle **Install from a list or specific location (Advanced)**, then click **Next** to continue.


Hardware Update Wizard
Welcome to the Hardware Update Wizard
This wizard helps you install software for:
LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

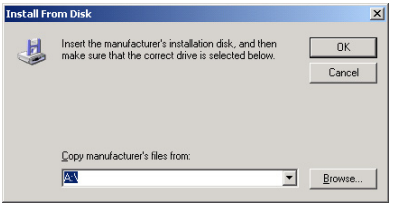
6. Toggle **Don't search. I will choose the driver to install**, then click **Next** to continue.


Hardware Update Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\Drivers\LSI 1064E\Driver\Windows\W2K3_32
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

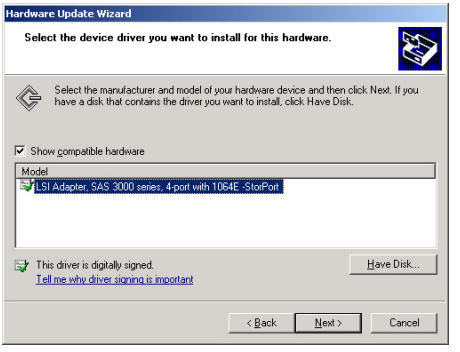
7. Insert the RAID driver disk you created earlier to the floppy disk drive.
8. Highlight **LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort**, then click **Have Disk**.


Hardware Update Wizard
Select the device driver you want to install for this hardware.
Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.
Show compatible hardware
Model
LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
< Back
Next >
Cancel

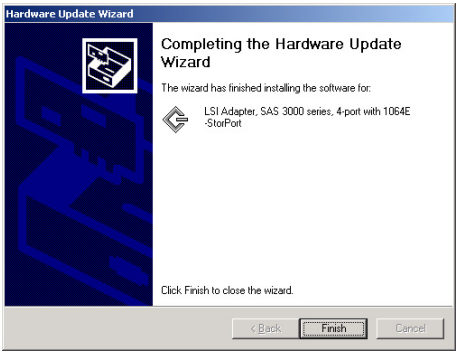
9. Select from the drop-down menu and locate the driver.



10. Click **Next** to start updating the driver.


Hardware Update Wizard
Select the device driver you want to install for this hardware.
Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.
Show compatible hardware
Model
LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
< Back
Next >
Cancel

11. After completing driver update, click **Finish** to close the wizard.


Hardware Update Wizard
Completing the Hardware Update Wizard
The wizard has finished installing the software for:
LSI Adapter, SAS 3000 series, 4-port with 1064E -StorPort
Click Finish to close the wizard.
< Back
Finish
Cancel

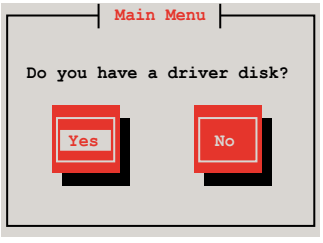
3.1.3 Red Hat® Enterprise Linux OS

To install the RAID card driver when installing Red Hat® Enterprise OS:

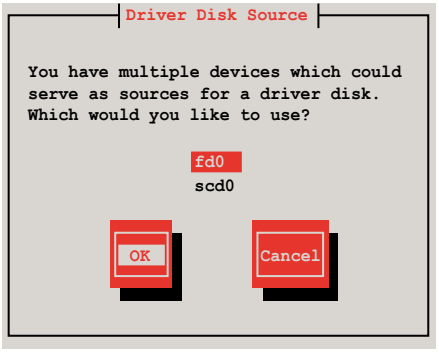
1. Boot the system from the Red Hat® OS installation CD.
2. At the **boot:**, type **linux dd**, then press <Enter>.

```
-  To install or upgrade in graphical mode, press the <ENTER> key.
-  To install or upgrade in text mode, type: linux text <ENTER>.
-  Use the function keys listed below for more information.
[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]
boot: linux dd
```

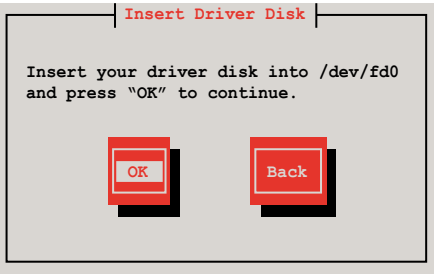
3. Select **Yes** using the <Tab> key when asked if you have the driver disk, then press <Enter>.



4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.

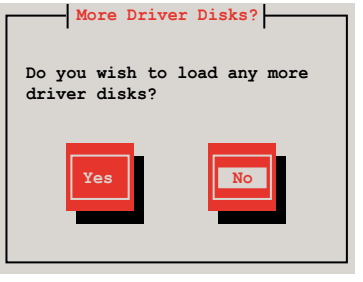

Driver Disk Source
You have multiple devices which could serve as sources for a driver disk. Which would you like to use?
fd0
scd0
OK
Cancel

5. Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



The drivers for the RAID card are installed to the system.

6. When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>.

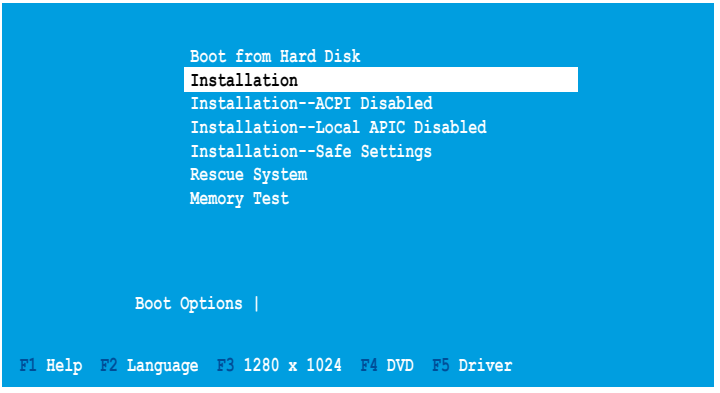


7. Follow the screen instructions to continue the OS installation.

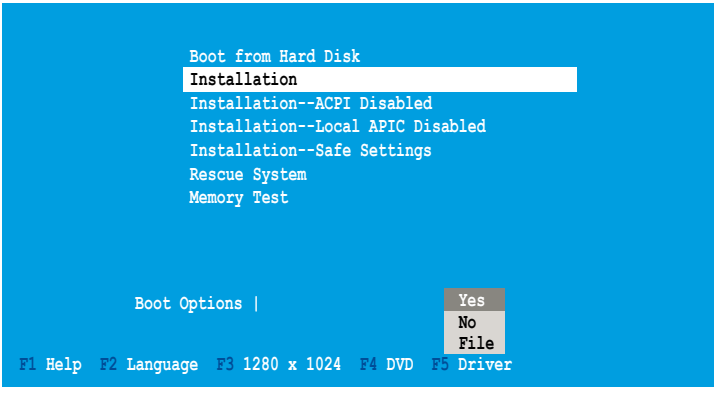
3.1.4 SUSE Linux Enterprise Server OS

To install the RAID card driver when installing SUSE Linux Enterprise Server OS:

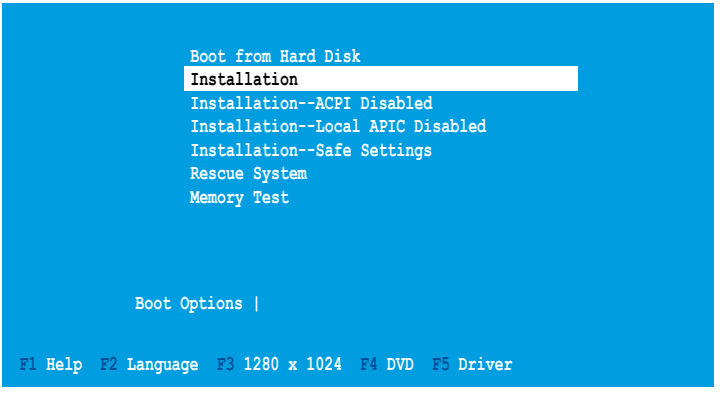
1. Boot the system from the SUSE OS installation CD.
2. Use the arrow keys to select **Installation** from the **Boot Options** menu.



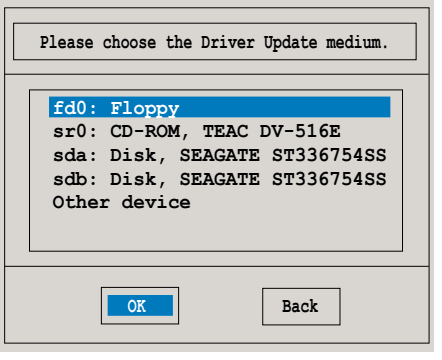
3. Press <F5>, then select **Yes** from the menu. Press <Enter>.



4. Insert the RAID driver disk to the floppy disk drive. Make sure that **Installation** from the **Boot Options** menu is selected, then press <Enter>.



5. When below screen appears, select the floppy disk drive (fd0) as the driver update medium. Select **OK**, then press <Enter>.



The drivers for the RAID controller are installed to the system.

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

Responsible Party Name: **Asus Computer International**

Address: **44370 Nobel Drive., Fremont, CA 94536 U.S.A.**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name: **SAS Raid Card**

Model Number: PIKE 1064E

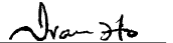
Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional Radiators
☐ FCC Part 15, Subpart C, Intentional Radiators
☐ FCC Part 15, Subpart E, Intentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name: **Ivan Ho/ President**

Signature: 

Date: **May. 30, 2008**

Declaration of Conformity

We, Manufacturer/Importer
(full address)
ASUS COMPUTER GmbH
HARKORT STR. 25
40880 RATINGEN, BRD. GERMANY

declare that the product
(description of the apparatus, system, installation to which it refers)

SAS Raid Card
PIKE 1064E

is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 2004/108 EC-EMC Directive

☐ **EN 300328**	Electromagnetic compatibility and Radio spectrum Matters (ERM); wideband transmission equipment operating in the 2.4GHz ISM band and using spread spectrum modulation techniques; Part 1: technical characteristics and test conditions Part2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE	☒ **EN 55022**	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
		☒ **EN 55024**	Information Technology equipment-Immunity characteristics-Limits and methods of measurement
☐ **EN 300386**	Electromagnetic compatibility and Radio spectrum Matters (ERM);Telecommunication equipment; ElectroMagnetic Compatibility (EMC) requirements	☐ **EN 50360/ EN 50361**	the limitation of exposure of the general public to electromagneticnetwork fields (0 Hz to 300 GHz) International Commission on Non-Ionising Radiation Protection (1998), Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields
☐ **EN 301489**	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic compatibility(EMC) standard for radio equipment and services; Part 17: Specific conditions for wideband data and HIPERLAN equipment	☒ **EN 61000-3-2***	Disturbances in supply systems caused
		☒ **EN 61000-3-3***	Disturbances in supply systems caused
☐ **EN 301 511**	Global System for Mobile communications (GSM);Harmonized EN for mobile stations in the GSM 900 and GSM 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (999/5/EC) Directive	☐ **EN 55013**	Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment
		☐ **EN 55020**	Immunity from radio interference of broadcast receivers and associated equipment
☐ **EN 301893**	Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive	☐ **EN 50081-2**	Generic emission standard Part 2 Industrial environment
		☐ **EN 50082-2**	Generic immunity standard Part 2: Industrial environment

☒ **CE marking** CE (EC conformity marking)

The manufacturer also declares the conformity of above mentioned product with the actual required safety standards in accordance with LVD 2006/95 EC

☐ **EN 60065**	Safety requirements for mains operated electronic and related appaatus for household and similar general use	☐ **EN 60950-1**	Safety for information technology equipment including electrical business equipment
☐ **EN 60335**	Safety of household and similar electrical appliances	☐ **EN 50091-1**	General and Safety requirements for uninterruptible power systems (UPS)

Manufacturer/Importer

(Stamp)

Date : May, 30 2008

Signature :

Name : Jonathan Tseng

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

Responsible Party Name: **Asus Computer International**

Address: **44370 Nobel Drive., Fremont, CA 94536 U.S.A.**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name: **SAS Raid Card**

Model Number: PIKE 1068E

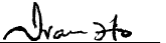
Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional Radiators
☐ FCC Part 15, Subpart C, Intentional Radiators
☐ FCC Part 15, Subpart E, Intentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name: **Ivan Ho/ President**

Signature: 

Date: **Jun. 4, 2008**

Declaration of Conformity

We, Manufacturer/Importer
(full address)
ASUS COMPUTER GmbH
HARKORT STR. 25
40880 RATINGEN, BRD. GERMANY

declare that the product
(description of the apparatus, system, installation to which it refers)

SAS Raid Card
PIKE 1068E
is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 2004/108 EC-EMC Directive

☐ **EN 300328**	Electromagnetic compatibility and Radio spectrum Matters (ERM); wideband transmission equipment operating in the 2.4GHz ISM band and using spread spectrum modulation techniques; Part 1: technical characteristics and test conditions Part2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE	☒ **EN 55022**	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
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Manufacturer/Importer

(Stamp)

Date : Jun, 4 2008

Signature :

Name : Jonathan Tseng